

## CLAIMS

What is claimed is:

- 1     1.     A method of determining the current service level of a wireless communication  
2           device, the method comprising the steps of:  
3           providing at least three distinct levels of service including a first level of service, a  
4           second level of service, and a third level of service;  
5           distinguishing between the first service level and the second service level based  
6           upon one or more characteristics of a forward channel from a messaging  
7           system to the wireless communication device; and  
8           distinguishing between the second service level and the third service level based  
9           upon one or more characteristics of a reverse channel from the wireless  
10          communication device to the messaging system.
- 1     2.     The method of claim 1, wherein new messages destined for the wireless  
2           communication device are stored by the messaging system while the wireless  
3           communication device is providing the first level of service.
- 1     3.     The method of claim 2, wherein new messages destined for the wireless  
2           communication device are transmitted to the wireless communication device by the  
3           messaging system and stored messages that remain undelivered as a result of the  
4           first level of service remain undelivered while the wireless communication device is  
5           providing the second level of service.

- 1 4. The method of claim 3, wherein both new messages and stored messages are  
2 transmitted to the wireless communication device by the messaging system while  
3 the wireless communication device is providing the third level of service.
- 1 5. The method of claim 1, wherein the one or more characteristics includes the  
2 forward channel's signal quality.
- 1 6. The method of claim 5 further including the step of generating a signal quality  
2 metric representative of the forward channel's signal quality over a predetermined  
3 period of time.
- 1 7. The method of claim 1, wherein the one or more characteristics includes a status.
- 1 8. The method of claim 7, wherein the status represents a value from one of a plurality  
2 of states, the method further including the step of associating each of the plurality of  
3 states with a weight.
- 1 9. The method of claim 8, wherein the plurality of states include:  
2 no signal;  
3 synchronization error;  
4 frame error; and  
5 good frame.
- 1 10. The method of claim 8 further including the step of generating a signal quality  
2 metric representative of the forward channel's signal quality over a predetermined  
3 period of time based upon weighted values of the status over the predetermined  
4 period of time.

1 11. The method of claim 1, wherein verification of the reverse channel is achieved upon  
2 receipt of an acknowledgment from the messaging system on the forward channel  
3 corresponding to a message transmitted to the messaging system on the reverse  
4 channel.

1 12. A method of transitioning between service modes and indicating a current service  
2 mode to a user of a wireless communication device, the method comprising the  
3 steps of:  
4 determining a status of a signal associated with a forward channel from a messaging  
5 system to the wireless communication device;  
6 determining a quality metric based upon the status over a predetermined period of  
7 time;  
8 providing a full service mode, a basic service mode, and a storing service mode;  
9 if the current service mode is the storing service mode, transitioning to the basic  
10 service mode after determining the quality metric is better than a first  
11 predetermined threshold;  
12 if the current service mode is the basic service mode, transitioning to the full service  
13 mode after verification of a reverse channel from the wireless  
14 communication device to the messaging system; and  
15 if the current service mode is the full service mode, transitioning to the basic service  
16 mode after determining the reverse channel has become degraded.

1 13. The method of claim 12 further comprising the step of providing an indication of  
2 the current service mode to the user.

- 1 14. The method of claim 12 further including the steps of:  
2 determining an initial value for the current service mode by  
3 inspecting the signal for synchronization information,  
4 initializing the current service mode to the storing service mode if no  
5 synchronization information is found, and  
6 initializing the current service mode to the basic service mode if  
7 synchronization information is found.
- 1 15. The method of claim 12 further including the steps of:  
2 in the basic service mode, transitioning to the storing service mode after the status  
3 indicates the wireless communication device is out of range;  
4 in the full service mode, transitioning to the basic service mode after determining  
5 the quality metric is worse than a second predetermined threshold; and  
6 in the full service mode, transitioning to the storing service mode after the status  
7 indicates the wireless communication device is out of range.
- 1 16. The method of claim 12, wherein the storing service mode includes a first storing  
2 state and a second storing state, and wherein the basic service mode includes a first  
3 basic state, a second basic state, and a third basic state, the method further including  
4 the steps of:  
5 in the first storing state, re-initializing a service quality monitoring process after the  
6 status indicates a good frame has been detected on the forward channel;  
7 in the second storing state, beginning a registration process after the status indicates  
8 a ping has been received from the messaging system on the forward  
9 channel;

10 in the first basic state, transitioning to the second basic state after determining the  
11 quality metric is better than a third predetermined threshold  
12 in the second basic state, transitioning to the third basic state after determining the  
13 quality metric is worse than the second predetermined threshold; and  
14 in the third basic state, transitioning to the second basic state after determining the  
15 quality metric is better than the third predetermined threshold.

1 17. The method of claim 16, wherein the first, second, and third predetermined  
2 thresholds are programmable parameters.

1 18. The method of claim 12, wherein new messages destined for the wireless  
2 communication device are not received by the wireless communication device while  
3 the wireless communication device is in the storing service mode, wherein new  
4 messages destined for the wireless communication device are received by the  
5 wireless communication device and stored messages that remain undelivered as a  
6 result of the wireless communication device having been in the storing service mode  
7 remain undelivered while the wireless communication device is in the basic service  
8 mode, and wherein both new messages and stored messages are received by the  
9 wireless communication device while the wireless communication device is in the  
10 full service mode.

1 19. The method of claim 12 further including the step of determining whether or not to  
2 attempt registering with the messaging system based upon the current service mode.

1 20. The method of claim 12 further including the step of periodically evaluating the  
2 quality metric.

1 21. A method of registering a wireless communication device with a messaging system,  
2 the method comprising the steps of:  
3 providing a current service mode in one of a plurality of states including  
4 a storing service mode in which new messages destined for the wireless  
5 communication device are not received by the wireless  
6 communication device,  
7 a basic service mode in which new messages destined for the wireless  
8 communication device are received by the wireless communication  
9 device and stored messages that remain undelivered as a result of the  
10 wireless communication device having been in the storing service  
11 mode remain undelivered while the wireless communication device  
12 is in the basic service mode, and  
13 a full service mode in which both new messages and stored messages are  
14 received by the wireless communication device while the wireless  
15 communication device is in the full service mode;  
16 a registration process determining what action to take based upon the current service  
17 mode.

1 22. The method of claim 21 further including the steps of:  
2 the registration process transmitting one or more registration messages to the  
3 messaging system during the basic service mode; and  
4 the registration process transmitting no registration messages to the messaging  
5 system during the full service mode and the storing service mode.

1 23. The method of claim 21 further including the steps of:  
2 determining a status of a signal associated with a forward channel from a messaging  
3 system to the wireless communication device;  
4 determining a quality metric based upon the status over a predetermined period of  
5 time;  
6 if the current service mode is the storing service mode, transitioning to the basic  
7 service mode after determining the quality metric is better than a first  
8 predetermined threshold;  
9 if the current service mode is the basic service mode, transitioning to the full service  
10 mode after verification of a reverse channel from the wireless  
11 communication device to the messaging system; and  
12 if the current service mode is the full service mode, transitioning to the basic service  
13 mode after determining the reverse channel has become degraded.

1 24. The method of claim 23 further including the steps of:  
2 determining an initial value for the current service mode by  
3 inspecting the signal for synchronization information,  
4 initializing the current service mode to the storing service mode if no  
5 synchronization information is found, and  
6 initializing the current service mode to the basic service mode if  
7 synchronization information is found.

1 25. The method of claim 23 further including the steps of:  
2 in the basic service mode, transitioning to the storing service mode after the status  
3 indicates the wireless communication device is out of range;

4 in the full service mode, transitioning to the basic service mode after determining  
5 the quality metric is worse than a second predetermined threshold; and  
6 in the full service mode, transitioning to the storing service mode after the status  
7 indicates the wireless communication device is out of range.

1 26. A wireless communication device comprising:

2 a storage device having stored therein a service mode determination routine for  
3 providing a plurality of service modes including a full service mode, a basic  
4 service mode and a storing service mode;

5 a processor coupled to the storage device to execute the service mode determination  
6 routine to evaluate a quality metric associated with a forward channel from a  
7 messaging system and identify a current service mode from the plurality of  
8 service modes, where:

9 the quality metric is generated based upon a status of a signal associated  
10 with the forward channel;

11 the current service mode is updated to the basic service mode from the  
12 storing service mode if the quality metric is better than a first  
13 predetermined threshold;

14 the current service mode is updated to the full service mode from the basic  
15 service mode after verifying a reverse channel from the wireless  
16 communication device to the messaging system;

17 the current service mode is updated to the basic service mode from the full  
18 service mode after determining the reverse channel has become  
19 degraded.



1 27. The wireless communication device of claim 26, wherein new messages destined  
2 for the wireless communication device are not received by the wireless  
3 communication device while the wireless communication device is in the storing  
4 service mode, wherein new messages destined for the wireless communication  
5 device are received by the wireless communication device and stored messages that  
6 remain undelivered as a result of the wireless communication device having been in  
7 the storing service mode remain undelivered while the wireless communication  
8 device is in the basic service mode, and wherein both new messages and stored  
9 messages are received by the wireless communication device while the wireless  
10 communication device is in the full service mode.

1 28. The wireless communication device of claim 27 wherein:  
2 the current service mode is updated to the storing service mode from the basic  
3 service mode after the status indicates the wireless communication device is  
4 out of range;  
5 the current service mode is updated to the basic service mode from the full service  
6 mode after determining the quality metric is worse than a second  
7 predetermined threshold; and  
8 the current service mode is updated to the storing service from the full service mode  
9 after the status indicates the wireless communication device is out of range.

1 29. A wireless communication device comprising:  
2 a storage device having stored therein a registration routine that determines  
3 registration processing based upon a current service mode;  
4 a processor coupled to the storage device to execute the registration routine to  
5 transmit zero or more registration messages to a messaging system based  
6 upon the current service mode, where:  
7 a storing service mode is provided in which new messages destined for the  
8 wireless communication device are not received by the wireless  
9 communication device;  
10 a basic service mode is provided in which new messages destined for the  
11 wireless communication device are received by the wireless  
12 communication device and stored messages that remain undelivered  
13 as a result of the wireless communication device having been in the  
14 storing service mode remain undelivered while the wireless  
15 communication device is in the basic service mode;  
16 a full service mode is provided in which both new messages and stored  
17 messages are received by the wireless communication device;  
18 one or more registration messages are transmitted to the messaging system  
19 while the current service mode is the basic service mode; and  
20 no registration messages are transmitted to the messaging system while the  
21 current service mode is the full service mode or the storing service  
22 mode.